Amendments to the Claims

Listing of Claims:

Claims 1 – 15 (canceled).

Claim 16 (new). A method of converting heat into mechanical work, in a cyclic process comprising the following steps:

compressing a working medium while giving off heat;

subsequently bringing the working medium into thermal contact with an ambient environment through a first heat exchanger;

expanding the working medium and thereby obtaining mechanical work; and

guiding the working medium through a second heat exchanger disposed inside a rapidly rotating rotor, the rotor having an exterior surrounded by at least one substantially annular gas chamber, and dissipating heat from an exterior of the gas chamber.

Claim 17 (new). The method according to claim 16, which comprises guiding the working medium through a compressor downstream of the rotor, in a working medium flow direction.

Claim 18 (new). The method according to claim 16, wherein the working medium takes up ambient heat in the first heat exchanger.

Claim 19 (new). The method according to claim 16, which comprises conducting the working medium through the rotor substantially in an axial direction thereof.

Claim 20 (new). The method according to claim 16, wherein a temperature difference is built up in the rotor of at least 100 K.

Claim 21 (new). The method according to claim 20, wherein a temperature difference is built up in the rotor of at least 300 K.

Claim 22 (new). The method according to claim 21, wherein a temperature difference is built up in the rotor of at least 500 K.

Claim 23 (new). The method according to claim 16, which comprises dissipating the heat via cooling ribs on an outside of the rotor.

Claim 24 (new). The method according to claim 16, which comprises dissipating the heat through a third heat exchanger on an outside of the rotor.

Claim 25 (new). An apparatus for converting heat into mechanical work, comprising:

a rotor having an axis defining an axial direction;

a heat exchanger configured to conduct through flow substantially in the axial direction, having a substantially ring-cylindrical configuration, and being outwardly bounded by a substantially cylindrical wall; and

said heat exchanger being surrounded by a substantially annular gas chamber divided, in a radial direction, into a plurality of ring-cylindrical partial chambers.

Claim 26 (new). The apparatus according to claim 25, wherein said partial chambers are configured to receive mutually different gases.

Claim 27 (new). The apparatus according to claim 26, which comprises a pressure control device communicating with said ring-cylindrical partial chambers for setting an internal pressure therein.

Claim 28 (new). The apparatus according to claim 27, wherein said pressure control device is disposed in a region of said axis of said rotor.

Claim 29 (new). The apparatus according to claim 25, which comprises cylindrical separating walls separating said ring-cylindrical partial chambers from one another.

Claim 30 (new). The apparatus according to claim 25, wherein working medium is fed in and discharged, respectively, through shafts of said rotor.

Claim 31 (new). The apparatus according to claim 25, which comprises a housing with magnets disposed to hold said rotor in said housing by exerting an inwardly directed magnetic force on a circumference of said rotor.

Claim 32 (new). The apparatus according to claim 25, wherein said gas chamber is subdivided in the radial direction into at least three ring-cylindrical partial chambers.

Claim 33 (new). The apparatus according to claim 25, wherein said gas chamber is subdivided in the radial direction into at least four ring-cylindrical partial chambers.